

REMARKS

The above listed claim amendments along with the following remarks are fully responsive to the Office Action set forth above.

The specification has been amended to correct inadvertent typographical errors.

Claim Rejections – 35 USC § 112

Claims 19, 22 and 32 were rejected as being indefinite. Each of these claims have been corrected to now more particularly claim that aspect of the present invention wherein “a number of scan lines” is recited. These amendments to claims 19, 22, and 32 were not made to define over prior art.

Claim Rejections – 35 USC § 102


Claims 1, 3, 17-20 and 34-42 were rejected as anticipated by Schudel, US patent 5,588,200.

Claims 1, 3-22, and 34-42 were rejected as anticipated by Singh, US patent 6,011,239.

Applicants controvert the characterization of Schudel in the Office Action when it says Schudel discloses that static roll and pitch characteristics of the suspension are corrected by a beam by directing the beam to a target area. In fact, Schudel requires mechanical torsional stress to be applied to the load beam to correct static attitude characteristics (see Schudel, Abstract, line 11; column 3, lines 20-21; column 5, lines 31-33).

Applicants agree that Singh discloses a method for adjusting the static attitude in a head suspension assembly using a laser. However, applicants respectfully, but most strongly controvert the allegation in the Office Action that Singh discloses a plurality of scanning lines which are irradiation regions. Even though Singh mentions that lines 102, 106 and 110 are “irradiation regions” (at column 6, lines 22-29) it is apparent from other parts of the description¹ of Singh that what is actually subjected to laser output are discrete areas 114,

¹ See, e.g., column 5, lines 34 and 35, where Singh states “a **plurality of points** on the area of the hinge region 22 can be subjected to the laser output (see FIG. 7).” [emphasis added]



118, 119, 122 and 126 (see Figure 7). While it is true that sets of these areas are located along lines 102, 106 and 110, respectively, Singh refers to heating one or more small areas of approximately 0.01 to 1 mm^2 , (column 6, line 67), to be heated with a high intensity laser pulse (column 7, line 1).

In Example 1, Singh says:

The multiple pulses illustrated in FIG. 8 were delivered to a single area in the hinge region 22 corresponding to the area 114 in FIG. 7. Similar results are obtained when the multiple pulses are delivered to a plurality of areas, such as the areas 118 and 119 shown in FIG. 7. [emphasis added] (column 7, lines 56-61).

There would be no need for Singh to identify or discuss the areas such as 114, 118 and 119 if Singh were continuously scanning along lines such as 102. It is thus apparent that Singh does not teach or suggest scanning continuously even one line, as is presently claimed in each of the independent claims of this application.

The Independent Claims Amendments

Each of the independent claims of the present application have been amended to make it clear that the practice of the present invention is to provide continuous scanning along at least one line with a laser to adjust the static attitude of a head suspension. Neither Schudel nor Singh teach or suggest this aspect of applicants' claimed invention. Schudel applies infra-red energy to a general target area 38, while mechanically flexing the load beam (see Schudel, Figure 6 and column 5, lines 32 and 45). Schudel does not teach or suggest directing a laser along a line. Singh directs laser energy to individual areas (such as 114, 118 and 119). Neither Singh nor Schudel teaches or suggests continuously scanning a laser along a line.

Claim 1 has been amended to now recite that the step of scanning is performed along at least one line continuously to provide selective adjustment of at least one of pitch and roll static attitude of the head suspension.

Claim 20 has been amended to now recite that both the first and second steps of scanning are along at least one line continuously to warp the scan region.

Claim 34 has been amended to now recite that scanning a laser beam continuously along at least one line across the metal region to bend the metal region of the suspension to have a desired static attitude.

The Dependent Claims 3-19 and 21, 22

Each of these dependent claims is allowable for the reasons stated with respect to the claim or claims from which it depends. Furthermore the following claims are patentable for the following respective reasons.

Claim 3 is allowable because neither reference anticipates the step of scanning a first scan region in a first spring arm of a flexure of a head suspension.

Claim 5 is allowable because neither reference anticipates the step of scanning a second scan region located in a second spring arm of the head suspension flexure.

Claim 6 is allowable because neither reference anticipates the step of scanning a plurality of lines in first and second scan regions.

Claim 7 is allowable because neither reference anticipates a plurality of lines scanned in the first and second scan regions extending substantially across the width of the first and second spring arms, respectively, with the plurality of lines being substantially parallel to a transverse axis of the head suspension.

Claim 11 is allowable because neither reference anticipates the step of scanning a first scan region located in a cross piece at a distal end of a head suspension flexure, the first scan region being adjacent and spaced apart in a first direction from a longitudinal axis of the head suspension.

Claim 12 is allowable because neither reference anticipates the step of scanning a second scan region located in the cross piece of the flexure with the laser beam, the second scan region being adjacent and spaced apart in a second direction that is opposite the first direction from the longitudinal axis of the head suspension.

Claim 13 is allowable because neither reference anticipates scanning a plurality of lines in first and second scan regions.

Claim 14 is allowable because neither reference anticipates a plurality of lines substantially extend across the width of the cross piece, with each of the plurality of lines



being substantially parallel to the longitudinal axis of the head suspension, and wherein the scanning of the plurality of lines causes a cross piece to warp by an angular amount about the longitudinal axis at the first and second scan regions.


Claim 15 is allowable because neither reference anticipates a first scan region located on a first surface of a cross piece.

Claim 16 is allowable because neither reference anticipates scanning a plurality of lines in a third scan region of the head suspension located in a first spring arm of the head suspension flexure; nor scanning a plurality of lines in a fourth scan region of the head suspension located in a second spring arm of the head suspension flexure. Claim 16 is further allowable because neither reference anticipates a plurality of lines scanned in third and fourth scan regions which are scanned substantially across the width of first and second spring arms, with the plurality of lines scanned in the third and fourth scan regions being parallel to a transverse axis of the head suspension, and the scanning of the plurality of lines in the third and fourth scan regions causes the third and fourth scan regions to warp by an angular amount about the transverse axis of the head suspension.

Claim 19 is allowable because neither reference anticipates determining the amount of scanning as the number of scan lines scanned in the head suspension.

Claim 21 is allowable because neither reference anticipates first and second pluralities of scan lines in the scan region.

Claim 22 is allowable because neither reference anticipates performing a coarse static attitude adjustment which includes the steps of determining the pitch error between a desired pitch static attitude and the measured pitch static attitude of the head suspension; determining the roll error between the desired roll static attitude and the measured roll static attitude of the head suspension; determining the location of at least one scan region on the head suspension to compensate for one of the pitch error and roll error; and predicting a number of scan lines for the first plurality of scan lines necessary to compensate for a portion of the one of the pitch error and roll error.



The Allowable Claims

Claims 23-33 were indicated as allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and overcoming the 112 rejections.

Claims 23-33 are allowable for the reasons stated with respect to claim 20.

The Dependent Claims 35-42

Each of these dependent claims is allowable for the reasons stated with respect to the claim or claims from which it depends. Furthermore, the following claims are also patentable for the following respective reasons.

Claim 36 is allowable because neither reference anticipates providing scan number/static attitude change information describing a relationship between number of scans and static attitude changes; and determining the number of scans which will cause the suspension to have the desired static attitude as a function of the measurement and the scan number/static attitude change information; and continuously scanning the laser beam across the metal region the determined number of times.


Claim 37 is allowable because neither reference anticipates controllably scanning the laser beam by controlling the number of continuous scans.

Claims 38 and 39 are allowable because neither reference anticipates controllably scanning the laser beam by controlling the location of the continuous scans.

Claim 40 is allowable because neither reference anticipates controlling the location of the scans by controlling a surface of the metal region which is scanned.

Conclusion


All pending claims are now in condition for allowance. A notice to that effect is respectfully requested.



Respectfully Submitted,

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